

Abstract of the Disclosure

A semiconductor manufacturing process wherein silicon nitride is plasma etched with selectivity to an overlying and/or underlying dielectric layer such as a silicon oxide or low-k material. The etchant gas includes a fluorocarbon reactant and an oxygen reactant, the ratio of the flow rate of the oxygen reactant to that of the fluorocarbon reactant being no greater than 1.5. The etch rate of the silicon nitride can be at least 5 times higher than that of the oxide. Using a combination of CH_3F and O_2 with optional carrier gasses such as Ar and/or N_2 , it is possible to obtain nitride:oxide etch rate selectivities of over 40:1. The process is useful for simultaneously removing silicon nitride in 0.25 micron and smaller contact or via openings and wide trenches in forming structures such as damascene and self-aligned structures.